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Controlling plasma properties in a dc discharge with two anodes and a cold cathode[1] VLADIMIR DEMIDOV, WVU and SPbGU, EVGENY BOGDANOV, SPbGU, MARK KOEPKE, WVU, ANATOLY KUDRYAVTSEV, SPbGU, IYA KURLYANDSKAYA, SPbU SES, OLGA STEPANOVA, SPbGU —
Understanding the interaction between sheath and contacting electrodes is important for predicting plasma kinetics and controlling plasma properties for various applications where the plasma is volumetrically confined To demonstrate controlling electron temperature in nonlocal plasma, modeling a dc discharge with cold cathode and application of different voltages to the discharge anodes has been performed. The modeling has been conducted in low-pressure argon gas discharge. It has been demonstrated that applied voltage can modify trapping within the device volume the energetic electrons arising from atomic and molecular processes in the plasma and emitted from the cathode due to ion bombarding. This leads to transformation of heating slow electrons by energetic electrons and as a result modifies the electron temperature. This also leads to modification of spatial distribution of densities of charged and excited metastable atom particles and plasma potentials. The above effects have also been experimentally demonstrated in short (without positive column) dc discharges of various constructions.

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